THE DELAWARE AND HUDSON RAILROAD BULLETIN

MARBLE QUARRY
WEST RUTLAND, VT.

"the D&H"

JANUARY 1, 1935

Jes' Supposin'

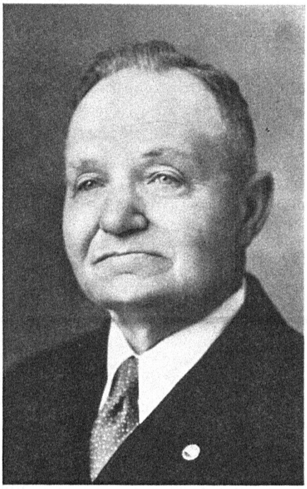
JES' supposin' the course of '35 had run
And we could retrospect, and see
The things that we had done, and left undone,
The sharp word that cut deeper
Than a two-edged sword,
The cruel glance, the haughty look
That caused someone to hide his face, and took
The joy from that one day away.
The half-clothed child we brushed aside,
And in our face he never spied
One spark of love, or sympathy.
The selfishness that we portrayed to Mother dear,
When she so longed to know our plans—
We saved the news for other ears
That cared not, and left her in tears.
May resolutions strong be made and kept
This whole year through!
O God, I pray we have no regrets
NEXT *New Year's Day!*

—RUTH SMELTZER.

The
DELAWARE AND HUDSON RAILROAD
CORPORATION
BULLETIN

Patched Soldiers' Shoes

Veteran Carbondale Engineer once Served in German Army



JOSEPH KARL

IN a little German home an aged mother, now ninety-five, still hopefully awaits the return of a son who left her to come to America nearly a half century ago. It was in 1887 that JOSEPH KARL, then twenty-seven, set out from the little farmhouse in which he had been born, to seek his fortune in a foreign land, although he confidently expected that before many years he would return to his family. Yet the days flew by and MR. KARL completed forty-four years in the employ of The Delaware and Hudson Company. Now that he has retired on pension he is thinking seriously of returning home to visit his mother who, in the forty-five years since he last saw her, has maintained her contact with her son by means of the letters which arrive at regular intervals from across the sea.

JOSEPH was born on a tiny farm at Wallersdorf, Bavaria, October 7, 1860. After six years of schooling he worked for his father on the farm until shortly after his nineteenth birthday when he was summoned to Ingstadt to begin the compulsory three-year enlistment in the German army along with every other able-bodied youth of his age. Their barracks were situated within a walled fortification, the interior of which was guarded night and day by armed soldiers under strict orders to shoot to kill at sight any civilian who ventured beyond well-defined limits. While in the army every cadet had to learn some trade; JOSEPH became a shoemaker, although he never worked at it after his discharge.

Returning to the farm for the last time, JOSEPH saved every pfennig he could earn so that he could buy his passage to America. Once before, when he was fifteen, he had the funds but was refused permission to leave the country because he had not yet been given military training. Finally, when he was 27, he and his young bride were given passports to America. Never since have they seen their native land.

Almost immediately after his arrival MR. KARL was employed as a slate-picker in the Coalbrook Breaker of The Delaware and Hudson Canal Company at $.50 for half a day's work. Shortly afterward he was hired by Michael Brown, foreman of the track section extending from Carbondale to Olyphant as a trackman at $1.25 per day.

When the lower roundhouse at Carbondale was being built MR. KARL was employed in a company-owned quarry from which stones for the foundation were procured. No sooner was this work completed than he was employed as a hostler helper by roundhouse foreman Joseph Eidle.

A few years later, when MR. KARL became a hostler, twenty-four of the Delaware and Hudson engines were culm burners, the balance using lump coal, which was thrown into the firebox by hand instead of with a shovel.

In 1892, MR. KARL became a locomotive fireman, making his initial run with engineman John Gillis on engine No. 50, a single cab Mogul, from Carbondale to Nineveh and return. His experience in and about the roundhouse as a hostler served him in good stead so that he had little difficulty in keeping up steam or learning to handle an engine on the road. In those days twenty-five loaded cars constituted a full train north from Carbondale; today trains of 100 much larger cars are not uncommon.

On July 5, 1901, MR. KARL was promoted to the right side of the cab and he completed his forty-four years of railroading as an engineman. Most of his running was done on mine runs out of Carbondale, although he did considerable work on through freight trains.

In all his years as an engineman MR. KARL never injured anyone although his record was nearly shattered twenty years ago. One day while backing on to a train, the trainman frantically signalled him to stop. Applying the brakes in emergency he stopped and dropped to the ground. There under the pilot was the body of a man. They were about to go under after him when the man suddenly scrambled out. The "victim" was a trackwalker who had been knocked down but had had presence of mind enough to lie still till the engine stopped. As a result a slight scratch on one side of his face was the only injury he suffered in being run over by a locomotive.

Now that his railroading days are over MR. KARL spends much of his time chopping wood which serves not only to keep the fires burning at home but helps keep him in trim as well.

MR. KARL has seven children living: Theresa Karl, who is at home; Joseph, Jr., of Philadelphia; Mrs. Thomas Murphy, of Carbondale; Charles of Scranton; and Frank, Herman, and John of Carbondale.

He is a member of The Delaware and Hudson Veterans' Association, The Brotherhood of Locomotive Firemen and Enginemen, and the German Society. MR. and Mrs. KARL live at 89 Green Street, Carbondale.

Usual

"Do you suffer with rheumatism?"

"Certainly; what else could I do with it?"

80,000 Pictures a Second Taken by German Camera

A GERMAN engineer has developed a motion-picture camera which will take 6,000 pictures a second and which, by reducing the size of each frame, can be made to record as many as 80,000 exposures a second. The camera is expected to be useful in many ways, and particularly in furthering engineering studies. Many actions, which have been little understood because there has been no way of definitely checking what takes place when they occur, can now be followed closely in slow-motion images.

Research engineers may revolve flywheels at speeds that cause them to burst, and determine just what happens. The result will be better and safer flywheels. Vibration of rapidly rotating shafts may likewise be scrutinized and an annoying trouble lessened. These are only two of the myriads of technical problems that may be solved with the aid of this remarkable new photographic instrument.

The speed limit of the new camera when making ordinary-size pictures is 250 exposures a minute, and as the number of pictures increases above that figure their size diminishes. At its extreme speed it takes virtually a continuous view, and a normal-size frame contains about 110 exposures. Since it is impossible to open and close a shutter as fast as this camera calls for, that detail is handled by means of a rotating element containing a lens, the image being recorded when this passes a fixed lens.

The camera holds 262 feet of film, which is enough for only 4 seconds' run when making an average technical film. Because of the high speed at which the film flows through the machine, no attempt is made to wind it on a reel after exposure. Instead, it is run into a lightproof bag that is fastened to the underside of the camera.—*Compressed Air Magazine.*

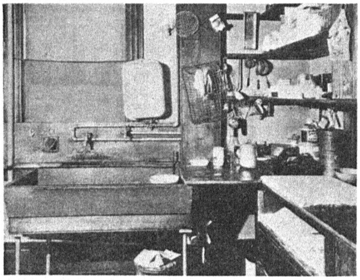
To A Friend

HE was my friend. He understood
All the vagaries of my mood.
Say I was joyous, he was gay;
If sad, he felt the selfsame way.
He held, with trusty common sense,
All that I told, in confidence.
He died. And now I look around,
But such a friend is seldom found.
I miss his kindly presence yet,
A dog like that is hard to get.

—*Eldredge Dennison.*

Sixteen Million Jobs

Need Doing in American Homes, Says Federal Housing Administration



One of the Sixteen Million

PERHAPS yours is one of the sixteen million or more American properties in need of immediate repair and modernization. Perhaps yours is one of the almost fifteen million American homes in need of repair—in need of the installation of heating plants, new bathrooms, modern kitchens, repaired roofs, and the one-hundred-and-one other things needed to make a house a *home*.

One of the biggest jobs in the world needs doing. Back in 1919 the world looked askance at the tremendous job that was facing France and Belgium in restoring their devastated areas that were torn and almost leveled of every habitation during the war.

The modernization job now facing America is greater than that which faced France and Belgium; greater in hours of work needed to do the job; greater in tonnage of materials.

The requisition would read something like this, if it were boiled down to one order:

"I want 30 million barrels of paint, 16 million squares of roofing, 300 thousand carloads of cement, 5 million heating plants and about all the wall paper and flooring you can make in the next two years. That is just part of my order, but start with that much of it."

That is perhaps the biggest piece of business railroad men have ever heard of. There is enough there to keep freight cars in motion, to call out new crews, to keep everyone busy as the proverbial bee. And the chances are it will keep them busy in winter, when even the bees retire to their hives.

The materials needed in the remodeling and modernization of the American homes would, if the whole job were to be done inside of a year, tax the ability of our common carriers to move them.

When we remember that over half the city dwellings in this country do not have central heating plants, we can begin to visualize what the movement of about five million of them would mean. Add to that the bathroom and kitchen equipment, the plaster, the cement, the paint, the timber and the nails.

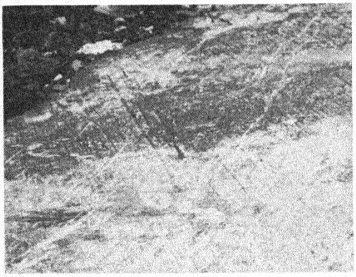
Look over your home today with the critical eyes of a buyer or renter. Would you buy it as it stands? Would you rent it at the price you would ask? What would you demand in it? Ask yourself these questions and then you will know what you want.

Remember that modernizing your home is what keeps it up to date. Remember, a leaky roof which could be repaired for $25, may cause $250 worth of damage in the next rainstorm. Remem-

(Concluded on page 12)

A Remodeled Kitchen

Vermont Marble

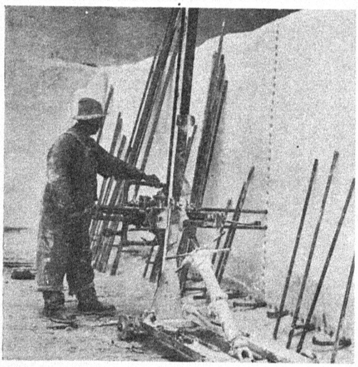


Glaciers Marked This Marble 20,000 Years Ago

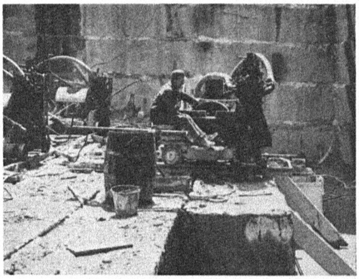
TWENTY thousand years ago the great polar ice-cap started on its "American Tour," the glaciers relentlessly grinding their way down over the northern half of our continent to approximately the 40th Parallel, or the latitude of Philadelphia. Gouging out the soil and loose rock in its path, the ice left its tracks in the marble heart of the Green Mountains of Vermont, where, protected by subsequent accumulations of earth and debris, they remained preserved until the day, 150 years ago, when the first quarries in that region were opened.

To get back to the formation of the marble it is necessary to follow the geologist's trail through 20 thousand times 20 thousand years to the time when the whole Green Mountain area from the St. Lawrence River to the mouth of the Hudson was part of the ocean bed. Then the little shell fish and lime producing animals began the work of building the marble beds, much as they built the coral islands of the tropical seas. The reader must make his own estimate of the myriads of these animals engaged in the work, their remains forming beds of shells over the entire western New England region, varying in thickness from 1,000 to 2,000 feet, subsequently turning to marble under the effects of heat and pressure.

Later, in the era of mountain-building, came the convulsions which thrust these portions of the earth's crust aloft to form the mountain ranges and hills over which the ice of the glacial period subsequently scraped its way.



Drilling and Wedging Blocks Apart



Channeling Machine in Quarry

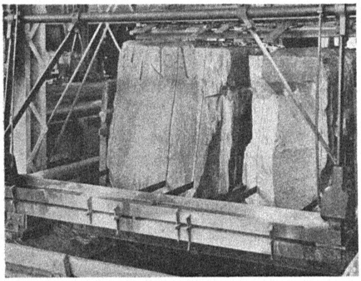
In Revolutionary days, Vermont pioneers discovered the outcropping ledges of marble and began splitting them up into slabs, thus founding a new industry. The product was first used for facings and hearthstones in the fireplaces of the settlers, then for headstones in the bleak churchyards and family burying grounds. Its use as a building stone started a little more than a century ago, the marble producing and railroad industries thus being contemporaries.

The Vermont Marble Company, which owns and operates quarries not only in Vermont but also in New York, Colorado, Montana and Alaska, and which has finishing plants and subsidiaries or branches in nearly all the larger cities of the country, has its principal finishing plant at Proctor, Vt., a short distance from its quarry on the Delaware and Hudson line at West Rutland.

Its Formation, Preparation and Uses; Reasons for its Great Durability

Most marble deposits occur in beds or layers, each of which has its own distinctive color and other characteristics, including decorative pattern. Because of these differences, individual beds are in most cases quarried separately.

At the surface the layers usually outcrop in an almost vertical position. The Danby deposit, where the strata appear on the side of a steep hill, in a nearly horizontal position, is a notable exception. At West Rutland, at a depth of about 225 feet, the deposit becomes thinner, the layers turn and proceed under the hill at an angle of about 30 degrees to the horizontal. The deepest marble quarry goes down 365 feet below the surface.

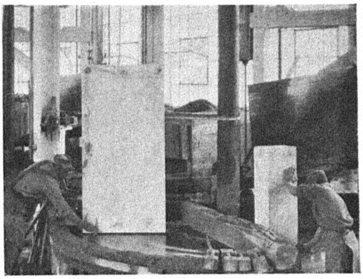


Sawing Blocks Into Slabs

Before quarrying operations are started at any point, prospecting is done by means of diamond-core drills and by cleaning and examining the surface outcrop. In spite of these precautions, the opening of a quarry is attended by considerable financial risk.

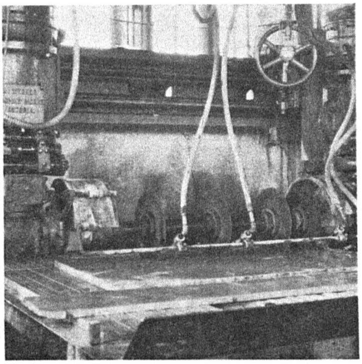
Blasting is not resorted to in quarrying marble because of the danger of shattering the blocks. The ancients had a method, still used in the Mexican onyx mines, by which they drilled lines of holes and drove wooden pegs into them. Water poured on the plugs caused them to swell, gently forcing the precious stone free without the least injury.

The modern method utilizes the channeling machine, a long row of chisels set in a strong traveling framework which moves on portable tracks laid on the quarry floor. These chisels vibrate up and down, cutting a channel in any desired direction in the face of the marble ledge. The depth can be varied according to the block to be cut out. When the channel has reached the desired depth, the machine is moved so that it cuts cross channels. The first few blocks, known as key blocks, must be cut on all four sides and wedged loose. After these are removed the remaining blocks are channeled on parallel sides only. A drill, placed in the space formed by the removal of the key blocks, makes horizontal holes between the layers and the bottom of the cut, after which the blocks are broken off by means of wedges.

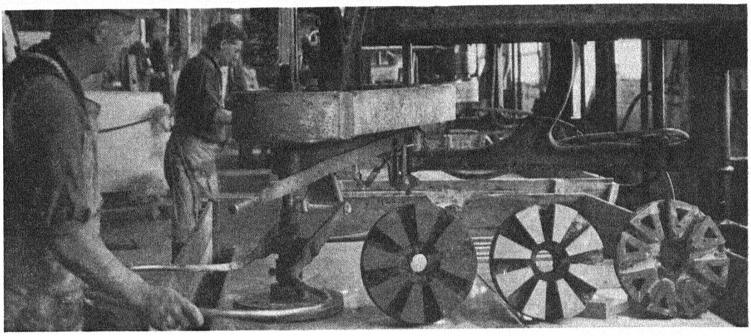


Marble Rubbing Beds

All of the Vermont Marble Company's quarrying machinery is electrically operated and the tunnels are lighted by the same means. At West Rutland, where the vein has been followed under the hill, electric railways carry the blocks to points where



Carborundum Cutters at Work



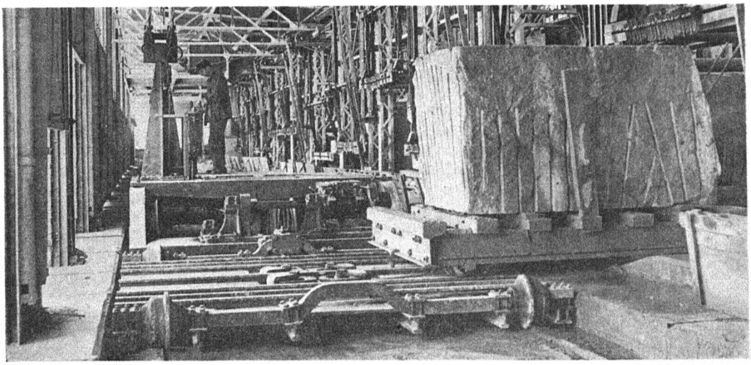
Marble Polishing Machine With Abrasive Heads

they can be reached by surface derricks or by cable cars. Operations are carried on in the marble quarries throughout the entire year.

The quarry at West Rutland is unquestionably America's most famous marble deposit. This remarkable vein produces fifteen different grades for monumental and building purposes, ranging in color from almost pure white to dark green, in addition to the various grades of blue marble which lie to the West of the white deposit. Quarrying here began about 1884. In recent years from 400,000 to 600,000 cubic feet (over 50,000 tons) of marble have been removed each year, and an unlimited quantity still appears to be available.

In the Pittsford Valley quarry a comparatively narrow deposit has been followed to a depth of over 300 feet, the tremendous lateral pressure being held in check by immense reinforced concrete struts. These quarries are noted for the huge size of the blocks obtainable. Blocks for columns 32 feet long and 4 feet square, as well as a piece some 14 feet square and 3 feet thick and weighing 63 tons were quarried here. The 14 columns for the Curtis Publishing Company building in Philadelphia, each a single block of stone weighing from 40 to 45 tons, came from Pittsford Valley. (Blocks weighing 66 tons have been quarried recently at Danby for the U. S. Supreme Court Building in Washington.)

Vermont Verde Antique is the name given to the standard dark green marble of America, which was first put on the market about 1850. The original



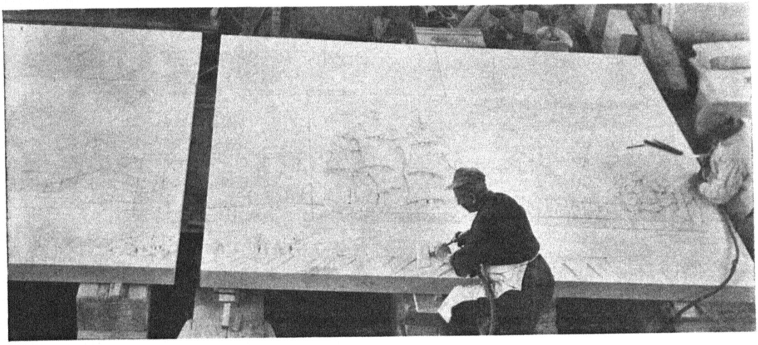
"Locomotive" Transfer Table Delivers Blocks on Cars to Machines in Mill

quarry at Roxbury, practically the geographical center of Vermont, was operated in a limited way until 1893, several new quarries having been opened up in central Vermont in the last ten years to meet the demand for this product. This green marble occurs in isolated masses which, roughly, resemble the shape of a double-convex lens standing on edge. It is of such extreme hardness that its removal presents a difficult problem. While the machinery is the same as that used in other quarries, specially tempered cutting steel must be used. The finishing also presents unusual problems, the bulk of this work being done in an especially designed and equipped plant at Swanton, Vt.

In addition to the several operations in the state from which it takes its name, the Vermont Marble Company has quarries at Bluff Point, N. Y., which are a familiar sight to regular travelers on the main line of the Delaware and Hudson. Less familiar are the quarries in Colorado and Alaska, previously referred to. The latter are in the vicinity of Prince of Wales Island, off the coast of British Columbia. Work there was started in 1908 and a considerable quantity of Alaskan marble was put on the market the following year. There the quarrying season lasts from February until December, much longer than might be expected until the effect of the close proximity to the Pacific Ocean is considered. The Alaskan quarries produce marbles which are very hard and take a splendid polish. They are used extensively for interior decoration.

Having jumped back 20,000 years to the ice age in the opening paragraph, it seems much less to ask the reader now to go back a matter of a mere 2,100 years to the origin of the process by which marble is sawed into blocks. There are no teeth visible in a marble saw, but the teeth are there, infinite in number as the sands. For they *are* grains of sand, washed down under the "saw" by a stream of water, each to grind its minute share of the cut. The machine blades are of soft steel, totally incapable of cutting the stone unaided, arranged in parallel "gangs" which saw a block into a number of thin slabs simultaneously. Often the same block when cut into slabs produces marble of several different grades.

Each block enters the mill supported on a car which is in turn carried on an electric locomotive, or, more properly, a transfer table, which moves down through the 1,000-foot length of the mill past tracks which serve each of the machines. After the blocks have been sawed into slabs the cars carry them on to the finishing shops or storage yards.



Carving Symbolic Decorative Panels

The infinite number of grains of sand used in the sawing operation can best be appreciated when it is realized that a big sand hill stood next to the mills in the early days, horse-drawn carts serving to supply the demand of that time. The hill disappeared and a short aerial tramway was stretched across the river to another sand deposit. Now the conveyor extends for more than two miles, over a mountain, to another suppy. For more than 20 years the steel buckets on the endless chain have been eating into that giant sand bank. They are arriving at the plant in Proctor, each with its load of 500 pounds, at the rate of one every 28 seconds. The amount of sand carried by the tramway, even when expressed in tons, runs into millions.

Marble for exterior use may go to the shop in slabs to be split or sawed with the diamond saw,

(Continued on page 11)

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Vol. 15 **January 1, 1935** **No. 1**

Self-confidence is the first requisite to great undertakings.

—SAMUEL JOHNSON.

* * *

1934 Index

DID you send for your copy of the Index for 1934? This handy little pamphlet contains a complete list of all illustrations, poems, prose compositions and feature articles contained in *The Bulletin* during the year, cross-indexed to assist in finding desired subjects. Copies will be sent free upon request as long as the supply lasts. Address "Supervisor of Publications, Delaware and Hudson Railroad Corp., Albany, N. Y."

New Year's Day

NEW Year's day did not always fall on January 1st. The Jewish people, Chinese and other nationalities still have their own New Year's day. The first mentioned have their New Year in September while the Chinese whoop it up between January 21st and February 19th, and it's some celebration.

Welcoming the New Year is a very ancient custom. It dates back to 3000 B. C. when Babylonians had a rousing time called Zakmuk and it was no one night stand but lasted ten or twelve days during the early part of March. There were other early carnivals having affinity with the Babylonians, among them being the Jewish Purim Feast, Greek Festival of Cronos and Roman Saturnalia. There is a story in each of these. Then as now New Year's day was not the same in all localities. The vernal equinox marked the Babylonian festivities while with other nations of that day the year ended with the winter solstice until Julius Caesar changed the date to January 1.

However, until 1752 England had celebrated the New Year on December 25 and March 25th. In the year mentioned England accepted and has since held to January 1.

A Practical "Joke"

A TRAGIC case, that of the 14-year-old student in a western city who sat on a tack placed on his schoolroom seat by a mischievous youthful companion.

The victim died when the wound became infected.

How forcibly the incident emphasizes two fundamental laws of safety. One, that horseplay should be avoided; the other that even seemingly unimportant wounds should be given prompt medical treatment.

Also the tragedy emphasizes that we cannot start safety instruction too early.

Three Resolutions

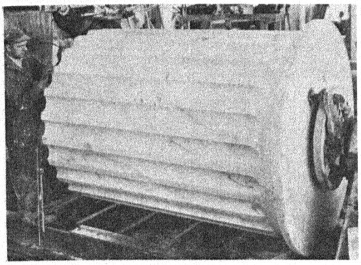
JANUARY 17 is the anniversary of the birth of that outstanding figure in American history, Benjamin Franklin, whose sagacious counsel helped the young republic to surmount many of the obstacles which arose with its formation.

Franklin set up for himsef a scheme of life which is an excellent model for anyone inclined to make New Year resolutions, and which may well be read thoughtfully by all. Like all Franklin's writings, they are short and to the point:

> "To apply myself industriously to whatever stance; to give nobody expectations that are not likely to be fulfilled; to aim at sincerity in every word and deed.
>
> "To apply myself industriously to whatever business I take in hand, and not divert my mind from my business by any foolish project of growing suddenly rich, for industry and patience are the surest means of plenty.
>
> "I resolve to speak ill of no man, not even in a matter of truth, but rather by some means excuse the fault that I hear charged upon others, and, upon proper occasion, speak all the good I know of everybody."

Vermont Marble

(*Continued from page 9*)



Fluting Marble Column

or it may be sawed down nearly to size in the mill. One diamond saw has 200 teeth, each of which is set with three diamonds forming a triangle on the tooth, making a total of 600 jewels in one circular blade. It then goes either to the rubbing bed or planer where it is reduced to correct size and form. Plain ashlar (square blocks) after it leaves the planer beds needs only to have its exposed faces finished and to be drilled for pins or the Lewis irons used in handling the marble in transit and during its erection.

The exterior finishes in common use are: sanded, tooled and axed. Sand finish is wrought by rubbing wet sand on the marble with a block of metal by hand. Both the tooled and axed finishes are applied by the stone cutter, the one with a wide flat tool, and the other with a series of fine chisels held together in a clamp, all operated by compressed air.

Turned work is brought to form in a lathe in much the same way that wood or metal is fashioned. The Proctor plant contains lathes capable of handling work from a few inches up to 30 feet in length and 6 feet in diameter. If a column is to be fluted, this work is done on a planer or carborundum machine. Machines are provided for producing work of any of the variety of shapes which can be produced in modern wood and metal working plants.

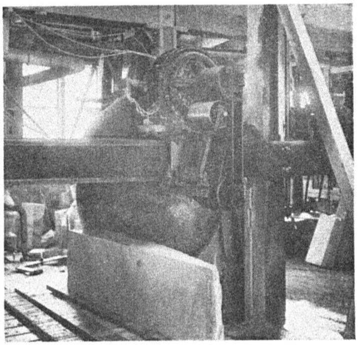
"Thin stock," ranging from ⅞" to 2" thick, is used for interior finish. This comes into the shop in the form of full-size slabs. These are first coped (roughly shaped to size) either by hand or on carborundum machines. The more fragile marbles, particularly the foreign varieties, are very difficult to cope by hand.

The pieces thus obtained then go to the rubbing beds where they are squared and worked down to exact size, all scars and scratches being removed. The rubbing bed is a horizontal iron plate 12 or 14 feet in diameter, which is rotated at a speed of about 40 revolutions per minute. Water charged with sand flows out from the center over the flat surface, and as the pieces of marble are held against it in fixed position, like tools in a boring mill, the abrasive action wears them smooth. Ordinarily each piece is rubbed separately but if there are several of the same size they may be clamped together and the combined edges rubbed in the same operation.

Leaving the rubbing beds, the marble goes to the polishers. The polishing machine consists of a movable arm at the end of which is a rapidly revolving disk. The marble is placed under this disk which is coated with abrasive material. Various disks are used in the process, ranging from a medium carborundum to a fine hone. The final polishing is done with a felt buffer and polishing powder. Most of these operations require a constant flow of water. The polishing machine is used almost exclusively for the faces of slabs, for although machines have been designed for polishing the edges they are still done largely by hand, the process being the same in either case.

Much of the molded work is done on the carborundum grinding machine. To be used economically, however, there must be considerable stock to be removed or a number of pieces of the same pattern. Otherwise the use of pneumatic tools is more profitable. In most cases they are applied also to carved work, for the finest detail of which it is sometimes necessary, however, to resort to the hammer and chisel method of olden times.

(*To be continued*)



This Saw Has 125 Diamonds in its Rim

Sixteen Million Jobs

(*Continued from page 5*)

ber that the bill for adequate heating is infinitely lower than doctors' bills and hospital bills.

Many people today own homes that could not be sold for $3,000. Yet they can borrow from $100 to $2,000 to do modernization and remodeling jobs which would add amazing new values to their property. It is already being done. Many new homes have been created within the past three months—created from abandoned houses that were on their way to the junk pile.

Local banks everywhere have been approved by the Federal Housing Administration. As a property owner, you simply fill out a credit statement at the bank and agree to repay so much per month.

Any property owner having a regular income, taxes paid and mortgage in good standing, may borrow any amount up to one-fifth of his annual income, to be used solely for property improvement. Your credit rating in your home town is all the security that is required.

Notes, which may be held by any Bank, Trust Company, Building and Loan Association or Finance Company approved by the Federal Housing Administration, or by the contractor or building supply dealer, may run from one to five years. They are paid off by making regular monthly payments just like any installment plan.

Many local Better Housing Committees have already been established throughout the country. In all likelihood there is a Better Housing Committee in your town or city. Do not hesitate to call upon them for further information.

The Federal Housing Administration has published a most interesting book entitled "Property Owners' Check List" which they will gladly send to any reader of *The Bulletin*. Simply send a postal card to the Federal Housing Administration, Washington, D. C., and ask them to mail you a copy of the booklet.

Not Guilty

Two men were out hunting when suddenly the game warden appeared and demanded to see their licenses. One immediately took to his heels, and the officer rushed off in pursuit. For ten minutes the two dashed over the fields, and finally the officer caught the fleeing huntsman.

"Now then," exclaimed the officer, almost out of breath, "I'll have to arrest you."

"What for?" demanded the hunter.

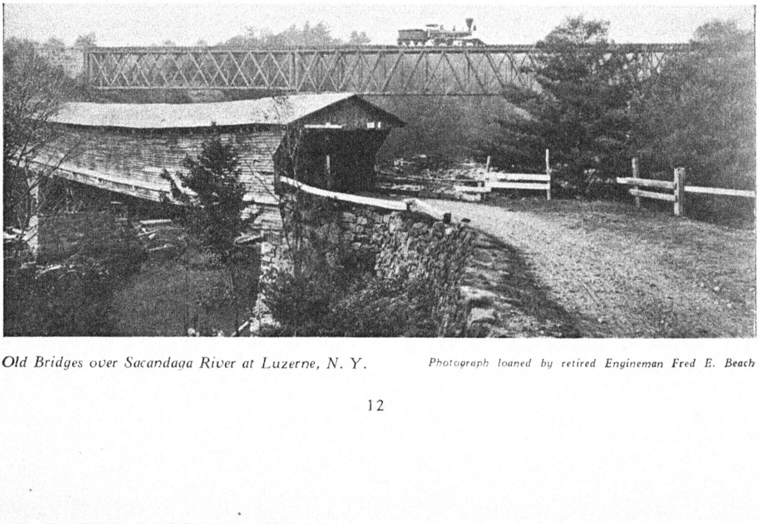
"For hunting without a license."

Very deliberately, the hunter fished the necessary document out of his pocket and presented it to the game warden.

"Why in blazes did you run away when you had a license?" asked the officer in astonishment.

"Well, you see," was the calm reply, "the other fellow didn't have any."—*Boston Transcript*.

On the Adirondack Branch



Old Bridges over Sacandaga River at Luzerne, N. Y.

Photograph loaned by retired Engineman Fred E. Beach

Why "Henry" Won't Start

Simple Battery Booster Saves Trouble in Cold Weather When Motors Balk

IT is a frigid day and you have left your car standing out of doors for hours. When you left it you took the precaution to use the "choke" when you shut off the engine, so you have gas in the cylinders, but now your starter will merely grind the cold engine over a few times before expiring. The engine will not "catch." If you have a strong arm you may get out and crank for a while and finally make it go. Why?

A college professor, not connected with the brain trust, gives not only the answer to this question, but a simple method of overcoming the difficulty, which is reprinted here with the thought that it may be used to advantage by *Bulletin* readers.

Writing in the December number of *The Technology Review*, Professor L. F. Woodruff of the Massachusetts Institute of Technology says:

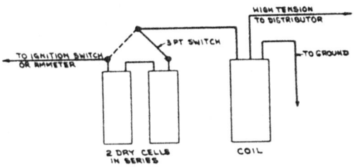
"When the starter is not spinning, but is merely turning slowly, the storage battery is called on to supply between 200 and 300 amperes. The voltage across the battery drops to about half its normal value, and even lower if the battery is in poor condition. This lowered voltage, perhaps only 3 volts, is all there is left available for your ignition. It is not enough to give you a spark, or at least one hot enough to cause an explosion in your cylinders. What can you do about it?

"Purchase 2 ordinary dry cells, costing about 30 cents each; a few feet of double conductor wire, preferably armored; and a 3-point switch, single pole, double throw.

"Disconnect one of the low tension leads from your induction coil and connect the two wires to the empty coil terminal and the wire just disconnected from it respectively. Attach the wire from the coil to the center or common terminal of the double-throw switch, which may be mounted at any point convenient to the driver's seat. The two dry cells, in series, (positive pole of one to the negative of the other) are connected across the other 2 terminals of the 3-point switch. The remaining end of the double conductor armored cable must be attached to either one of these last two terminals of the same switch, (or to the terminal of the dry cell which has already been connected to it) making this what may be called the 'non-booster' position, since the dry cells are cut out of the circuit when the switch is turned this way.

"Another cold day. You throw your 3-point switch to the booster position. You step on the starter, and the engine turns slowly. Instead of only 3 volts for ignition, you have another 3 volts from the dry cells, making 6 volts, enough to give a hot spark. As soon as the engine catches, switch back to the 'non-booster' position to save the dry cells for the next cold start."

The Booster



The solid line indicates the "booster" position. When switch is turned to the dotted line, the dry-cells are cut out and the car operates from the storage battery only. The booster may be connected to either low-tension terminal of the coil.

The professor adds a word of caution as to the proper method of connecting the dry cells to make sure they are "boosting" and not "bucking" the storage battery.

"In making the installation, the polarity of the dry cells relative to the main battery should be checked by noting the reading of the dashboard ammeter when the engine is still and the ignition switch turned on. If the normal ignition current is, for example, 6 amperes, the ammeter should read about 9 amperes with the booster battery cut in and properly connected, but only 3 amperes if the booster battery is reversed, in which case it is only necessary to interchange the wires at the terminals of the dry cells.

"If you are absent-minded and leave your 3-point switch in the booster position, you will quickly ruin the dry cells. To avoid this, put a spring on the switch to hold it in the non-booster position. With reasonable care the dry cells should last a season or two."

(In making use of the above we found that armored cable is not recommended by some dealers because of danger of the wire grounding on the armor, a well-insulated single conductor being preferable. A "bell-switch," costing 10 cents, is ideal for the job, making the total cost, including batteries, less than a dollar.—*Editor.)*

Heat and Fatigue

DURING part of July and August, 1932, a group of investigators came to Hoover Dam from Harvard University for the purpose of studing the question of fatigue in high temperatures. The result of their work was to emphasize the importance of keeping up the supply of chlorides and the blanket advice that every one should take an abundance of table salt with meals or otherwise when exposed to the danger of heat fatigue. During July and August, 1933, the average maximum temperature was 108; the minimum 90. High range 126. Average humidity 50%. Readings were taken at the upper dam levels from seven to eight hundred feet above the bed of the river. Temperatures at the bottom of the river canyon, where much of the work is going on, were normally about ten degrees higher than on the cliffs where the thermometers were located.

"In 1931, there were 17 deaths from heat exhaustion on the dam. In 1932, after the inception of salt program, there were no deaths and seven mild cases of exhaustion, all recovering. In 1933, no deaths and seven mild cases of exhaustion, all recovering.

"The plan of treatment was based on the principle that heat exhaustion is dehydration with loss of chlorides. A day on the desert demonstrates that some three or four quarts of water leave the body by visible or invisible perspiration, and a taste of the skin shows that it takes the chlorides with it. The salty taste of the arms surprised a group crossing the desert the other day. In high temperatures the body cools only by evaporation. Heat evaporates water from the body and thereby cools the skin. It may be in invisible quantities and the person may not show any perspiration, but after a few hours, careful weighing and the record of intake and output shows the enormous loss of water.

"In the opinion of the physician reporting the above experience at Hoover Dam, the autopsy findings after death from heat exhaustion and sunstroke indicate an out-pouring of water from the body until there is not enough fluid left in the blood vessels to keep up a sufficient pressure in the brain."—*The National Safety Council.*

Dangers of Dry Ice

THE use of dry ice is growing so rapidly that a word of cautious information is timely. Dry ice or solid carbon dioxide commonly used in packing ice cream has a temperature 110° below zero. If a particle should stick to your skin you would receive a "burn" much the same as would be received from hot tar—molasses, etc., so it is quite easy to imagine the results if a considerable piece should be swallowed, probably unobserved adhering to the ice cream. If it did not prove fatal, the victim would in all probability suffer for a long spell in a hospital, with a burned lining of the stomach.

As a plaything it has two serious hazards:

1st. If a piece should be confined in a small space, say in a fruit jar, the slow vaporing of the ice would build up such a tremendous pressure (about 225 pounds) and the gas would explode with great force.

2nd. It would be extremely unpleasant and injurious if someone should thoughtlessly put a piece of it "down the back of the neck" of a playmate as is so frequently and harmlessly done with ordinary ice.

Dry ice has tremendous possibilities commercially, but we must also learn its dangers.

—*Power and Light News.*

Suspicious

A university professor was calling at the home of a friend, and the latter's small daughter apparently felt called upon to entertain the guest. So she announced she would tell him a story.

"There was once a man named Columbus," she began, "an' a queen sent him on a voyage, an' his ships were named the *Nina,* an' the *Pinta* an'—an'—."

"*Santa Maria,*" prompted the professor.

"Yes, an' the queen's name was—"

"Isabella," suggested the professor.

"Say," said the little girl with sudden suspicions, "I'll bet you've heard this story before."—*Clipped.*

Tender Sentiment

When it came to the naming of the new mine, the prospector's wife said:

"Will you name it after me, dear?"

"Yes, darling, I will," said the prospector. "Yes, I'll name it in your honor."

And from that day to this, gentlemen, one of the richest gold mines in the Black Hills of South Dakota has been known as The Holy Terror.

Clicks from the Rails

Safe Crackers are Invited

to telephone Nescopeck 324 or 662-J before they break into the Pennsylvania Railroad station safe at that isolated point in Luzerne County, Pa. This strong box has been the target of so many robberies that the agent put a sign on the door reading: "This safe never contains more than $5. Don't break it open. If you want the combination, telephone * * ," and the two numbers follow.

✣

An Agitated Lady

passenger on our Susquehanna Division Train 305 asked the conductor if it were true that that there is a tunnel on the line. Answered in the affirmative, she requested that he tell her just before it was reached as she always became sick while passing through a tunnel. The conductor tactfully explained that she probably would not suffer on that trip, as the tunnel had been passed several minutes before.

✣

A Sewing Kit

is part of the "regular equipment" on a Boston and Maine commuter train. It seems that so many of the young lady passengers were bothered with "runs" in their stockings while on their way to work that they banded together, bought a box containing needles, thread, and pins, and entrusted it to the conductor to be produced if and when required.

✣

77 Miles in 65 Minutes

is the scheduled time of the *Cheltenham Flyer*, widely known as the world's champion "sprinter." Few travelers realize that the Chicago, North Shore & Milwaukee is a close second, its limited trains covering the 74 miles between Milwaukee and Chicago in 68 minutes. They make three intermediate stops and carry parlor and dining cars as well as coaches.

Mo, a Black Alley Cat

which had spent its entire three years among the third rails and fast freight trains in the Mott Haven yards of the New York Central, recently deserted the comparatively safety of the railway yard and ventured forth into a nearby street where highway competition was too much for him. After he had lost all nine of his lives under a hit-and-run driver's car, Mo's body was brought back to his home in the yard and now rests, with honors, beneath the signal tower.

✣

Stealing a Locomotive

from the Lehigh Valley Roundhouse at the Willard (N. Y.) State Hospital during the night of December 12, thieves abandoned it without lights on the main line 15 miles away. State, County, and Lehigh Valley police are searching for the parties who committed this crime, according to press reports. (Next morning it developed that the engine had run away unaided, "dying" on the main line when it ran out of steam.

✣

A Tomato Plant

on which 180 separate tomatoes grew this summer was shipped from North Tonawanda, N. Y., to the Burpee Seed Company, of Philadelphia, by Railway Express. It went forward in a huge cardboard box on the side of which was the statement: "This box contains one tomato plant bearing 180 tomatoes * * grown by Elmer E. Smith. Handle with care."

✣

A Huge Elephant,

which disputed the right of way with an express train on the Federated Malay States Railways' tracks, lost the decision. In this instance the answer to the old question: "What happens when an irresistable force meets an immovable body?" was one dead elephant.

A Theatre on Wheels

is being used by the Norfolk and Western to teach accident prevention to its employees. This all-steel unit is equipped with a screen, moving picture projection apparatus, and has 56 theatre seats and one lounge with space for four more persons. Light is excluded by having the glass in the windows painted black. Ventilation is provided by a series of individual screened openings beneath the window sills, which are below the line of vision and may be kept open when desired.

✣

The Heaviest Man

on the Norfolk and Western's payroll is believed to be "Big John" Winstead, colored laborer at the Lambert Point roundhouse, who tips the beam at 370 pounds. Winstead is "as broad as he is long" standing 67 3/8 inches tall and measuring the same around the waist. At home he has a specially constructed bed and a heavily reenforced chair, both engineered to stand up under the stress of his weight, which sometimes exceeds 400 pounds.

✣

A Revenue Collector

who stopped at Deepdene (England) to remove the receipts from a chewing gum vending machine, asked why the device was not in its customary place. The agent assured him that it was, but upon investigating discovered that it had been stolen during the night.

✣

The German State Railways

is at present the largest individual rail transportation undertaking in the world, according to a dispatch from London. Contrary to the general belief that the Canadian Pacific outranks all others, it is pointed out that the German enterprise has 35,000 miles of track, 12,000 passenger and freight depots, and 700,000 employees.

Two Roads

TWO roads stretch out, and only two, to where the pathway ends; the one lies charted, broad and clear, across the hills that make the year; the other twists and bends. Two voices whisper—two alone, to every human heart; the one says, "Wait; the hills are high; a cloud hangs down the sky!" The other whispers, "Start!" Two roads—two hearts—a goal to cross before the year is done; step out upon the beaten way; beyond the hill a brighter day; behind the cloud, the sun!"—AUTHOR UNKNOWN.